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ABSTRACT

The National Executive Service Corps, an organization which uses the skills and experiences of senior professionals, responded to the perceived shortage of qualified mathematics and science teachers in New York City. This paper describes a project designed to tap the skills and talents of retired scientists, engineers, and mathematicians who wished to enter teaching as a second career. The program consisted of five major parts: recruitment, orientation, training, placement, and support. These activities are described in the main body of this report. A project summary points out that second career teachers bring something current, real, and relevant to lessons. However, while they recognized the content area knowledge of this group of new teachers, supervisors also noted weaknesses in classroom management skills and urged the inclusion of a practicum in the training component. General recommendations for future programs and an outline providing suggestions for what should be incorporated into an education program for the targeted population are included. Appendixes, which comprise about half the document, provides a list of state offices and administrators of the Executive Service Corps Network; an evaluation report of the first cohort of NESC teachers 6-month teaching interview; a design for analysis of NESC programs; and the agenda of a conference program on "Technical Talent from the Military and Industry." (LL)

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FINAL REPORT

FUND FOR THE IMPROVEMENT OF POSTSECONDARY EDUCATION

National Executive Service Corps
257 Park Avenue South
New York, NY 10010

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GRANTEE ORGANIZATION:

National Executive Service Corps
257 Park Avenue South
New York, New York 10010

GRANT NUMBER:

GOO8730449-89

PROJECT DATES:

Starting Date: October 1, 1987
Ending Date: September 30, 1990
Number of Months: 36

PROJECT DIRECTOR:

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(212) 678-3497

FIPSE PROGRAM OFFICERS:

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GRANT AWARD:

Year 1: $ 82,950
Year 2 $102,170
Year 3 $100,170
Total $285,290

EXECUTIVE SUMMARY

A: PROJECT OVERVIEW

The National Executive Service Corps (NESC), an organization which uses the skills and experience of senior professionals to service the non-profit community, responded to the perceived shortage of qualified mathematics and science teachers in several ways. One of its programs, funded by FIPSE, was designed to recruit and prepare already retired scientists, engineers and mathematicians who wished to enter teaching as a second career. During the three years of the project, the program was expanded to include the soon-to-be retired and the younger professional interested in changing careers. The project initially focussed its efforts in two areas, New York City and the area around and including greater Hartford, Connecticut. The latter area met with little success, and virtually all our conclusions are based on the New York City experience.

B: PURPOSE

There is widespread belief that America's future economic success will depend on a highly trained work force, both scientifically and technologically. Our ability to succeed and to compete internationally will depend on the ability of today's teachers to train future scientists, mathematicians and technologically proficient workers. We were therefore interested in raising not only the quantity of science and mathematics teachers but also the quality. The goals and objectives of the FIPSE project were to tap the skills and talents of retired professionals (and career switchers) so that they could bring their background and experiences to the classroom and serve as role models for students, particularly minority students. For the participants, the project afforded an opportunity to continue to pursue their professional interests in ways that would be personally fulfilling as well as socially useful.

C: BACKGROUND AND ORIGINS

The program was sponsored by NESC whose members are a group of retired corporate executives who act as management consultants to the non-profit sector. The NESC affiliation proved useful for recruiting as it provided the necessary entree to corporations, professional organizations and retiree associations. The same lints had the potential to be useful in the dissemination process. But NESC volunteers had a corporate, not an educational background and did not fully understand the way colleges operate not could accept the rationale for a strong educational curriculum. Although a Math/Science Advisory Board was formed in early 1987, prior to the funding of the FIPSE grant, it was not used effectively, and provided little or no assistance to the FIPSE project.

Collaborations were established early on with the United Federation of Teachers, the New York City Teacher Centers Consortium, Brooklyn College, the Capitol Region Education Council in Hartford, Connecticut, the University of Hartford and Pace University. These relationships proved invaluable support throughout the project - providing host schools for observations, chairing information workshops, providing training for examinations at the Board of Education, and providing ongoing support for the successfully appointed "new teachers".

The collaborations formed in the greater Hartford area were very helpful but could do little when faced with the lack of need for teachers in the state of Connecticut. The relationship with the University of Hartford was significant because those contemplating retirement over the next three to five years are currently enrolled in a Masters program leading to full certification in Connecticut. The hope is that the need for science and mathematics teachers will increase during the years ahead.

D: PROJECT DESCRIPTIONS

The project consisted of five major parts--recruitment, orientation, training, placement and support.

We initially recruited those professionals who were already retired, but over time the participation was expanded to include early retirees as a result of corporate downsizing and career switchers who learned about the program through colleagues and articles in professional journals and in house newsletters. While the group became mixed, all potential participants needed a strong introduction and orientation which would provide the opportunity to observe the life of a teacher, to see the teaching/learning process in classrooms, to receive information on course requirements, licensure and certification requirements and an understanding of that to expect of a career in teaching. In addition, the participants needed time and support as they engaged in the decisionmaking process.

Courses in New York City were given under the auspices of Brooklyn College and taught by practitioners who were Teacher Center Specialists and served as adjunct professors. During the first year the group stayed together as a cohort; the support engendered by a cohort was extremely effective and helped the participants make the needed adjustments to a new career and many new experiences. The realities of life in the classroom, while different from their expectations, required extensive hand-holding and ongoing support beyond anything we anticipated. The course of study did not require a student teaching

component; this was a deficiency of the program and should be included in any future programs. During the second year, some of the participants were accepted into a scholarship program at Pace University and the development of a cohort was not possible.

The placement process proved to be difficult because of unusually chaotic conditions that existed at the New York City Board of Education. A smooth placement mechanism is essential and could be enhanced by strong, early collaborations and signed agreements with school districts. New York City places temporary per diem (TPD) licensed teachers last and placement often takes place after school begins. Individuals at the Board are very supportive and encouraging but cannot always guarantee that a placement is indeed available although listed in the computer. Principals and chairpeople often hire TPD's at the school site and the Board of Education finds out after a teacher has been sent out on assignment. In addition, TPDs frequently are victims of the enrollment decline that occurs in high schools during the spring term.

The Project Director brought the group together periodically, for courses and workshops, in order to provide mentoring and support that was frequently lacking in the schools. A strong mentoring program should be ascertained early in the relationships established with all Boards of Education. Ongoing support for the participants is continuing under the auspices of the New York City Teacher Centers Consortium. This support will continue because of the rapport established between the group and the willingness of a Teacher Center Specialist to maintain a relationship with the group members. Reunions also help to continue the needed support.

E. PROJECT RESULTS

Thirty participants are currently teaching in schools. Some are in independent schools, several in institutions of higher education and the others in New York City public schools. Six people are taking courses leading to certification in Connecticut. The numbers in public school would be higher if the placement process were more efficient and completed early. The economic conditions are having an impact upon New York City schools at the same time that the numbers of scientists, mathematicians and engineers to enter teaching as second careers are increasing.

Early evaluations were conducted in the form of interviews with teachers and their supervisors and in-depth interviews took place with seven of the candidates from the first cohort. A summative evaluation is being prepared but a long term satisfaction, impact on students and overall success cannot be determined without funding for a continuation grant. Participants were satisfied with the NESC

program; the level of advice and support provided by the grant was useful; the first year of teaching is extremely difficult in terms of classroom management and lesson planning and the lack of student teaching a real shortcoming of this program; the mentoring provided by the schools could have been stronger; ongoing support is necessary, desirable and extremely helpful. Dissemination is continuing in a variety of ways because of the former Project Director's new position. These activities are described in the body of the report.

F. SUMMARY AND CONCLUSIONS

A program to train second career teachers can be successful, regardless of their status as retirees, early retirees, or career switchers. Success is determined by the candidate's commitment, personality, love of children and desire to serve and have an impact upon the future of America. These qualities help the new teacher through the very difficult first year. Second career teachers do bring something "extra:" to the classroom. They bring something current, real and relevant to the lessons. Their real life experiences and applications make the lessons and the learnings more comprehensible and more meaningful to the students.

While supervisors recognized the content area knowledge of this unique group of new teachers, they noted also the weaknesses in classroom management skills and urged the inclusion of a practicuum in the training component.

General recommendations for future programs which seek to recruit non-traditional candidates to classrooms include:

* strong pre-entry component for information on requirements and introductions to schools;

* strong collaborative arrangements with school districts, teacher centers, unions and corporations for assistance in all phases of the program;

* strong mentoring and ongoing support throughout the early years of teaching;

* cohort groups to enable participants to help each other, network, and provide assistance to each other.

The following outline represents our suggestions for what should be incorporated into an education program for the targeted population:

* Establishment of collaborations

  - o Colleges - school districts for placement assurances
  - o Colleges - teacher centers for support guarantees
  - o Colleges/recruitment offices - corporations, military, voluntary, professional organizations and associations

* Pre-enrollment phase

  - o Orientation
  - o Observations in schools
  - o Focussed seminars - to discuss observations, dispel myths, recognize realities
  - o One day with a teacher - to observe the dailiness of teaching
  - o Information sessions - to provide knowledge of all the program requirements and steps necessary for obtaining the teaching credential and licensure procedures

* Preparation phase

  - o Centralized site in the school itself, if possible
  - o Practitioners as well as education professionals to teach the classes
  - o Student teaching component essential
  - o Flexible scheduling - days and hours

* Teaching phase

  - o Strong mentoring system in place
  - o Frequent meeting with mentors and master teachers
  - o On going support group
  - o Flexible teaching assignments - part-time, teaming

PROJECT OVERVIEW

The National Executive Service Corps (NESC), an organization which uses the skills and experiences of senior professionals to service the non-profit community, responded to the perceived shortage of qualified mathematics and science teachers in several ways. One NESC project enlisted retired math and science professionals as volunteers in high schools; another trained soon-to-be retired corporate and military professionals to enter a second career as teachers. In this project, corporate and military cooperation was vital both for recruiting and for support such as classroom space and released time for classroom observations. In general, the education component was time-shortened and contained little or no student teaching.

The third program under the aegis of NESC, which was the one funded by FIPSE, sought to attract and train those already retired to become math and science teachers. The project initially focussed its efforts on both New York City and Hartford, Connecticut, but ultimately concentrated on New York City primarily because there proved to be no real need for math and science teachers any place in Connecticut.

The FIPSE program included a series of classroom observations before entering, a body of coursework given by Brooklyn College before and during the initial teaching experience, and the use of "cohort groups" which would study and work together to provide continuing mutual support. A variety of recruitment techniques were used to make the scientific community aware of the opportunity.

Over the three year period, 41 people participated in New York City. Of these, 25 are currently teaching in public schools, 2 in independent schools, 2 in colleges and one serves as a volunteer. In Connecticut, 11 participated in the program. Of these, 4 are teaching, 4 continue to be employed elsewhere and 3 have abandoned the idea of teaching.

Considerable placement difficulties were encountered in both New York City and Hartford, in Connecticut because the need was not as strong as had been anticipated, and in New York City because of impediments inherent in New York City Board of Education procedures. In spite of these obstacles, the program was worthwhile; it can (and already does) serve as a model for those communities where need does exist, and can provide lessons about our ability to improve the quality of education, particularly in science and mathematics but with implications for other disciplines.

Because of the difficulties experienced in Connecticut, which have been fully discussed in our grant reapplications, the substance of this report will be on our program in New York.

PURPOSES

A variety of recent studies reveals that there is and will continue to be a shortage of mathematics and science teachers in the United States, especially in very rural and urban areas. The number of new graduates in these fields has shrunk over the last several years and of those that do graduate, many have chosen to go into industry. School districts have responded in many ways--uncertified teachers have been hired, teachers have been assigned outside their field of expertise, course offerings have been canceled. Educators believe that these types of responses can only result in a decline in the quality of teaching.

Interest in the problem of teacher preparation has been reinforced by the poor comparison of American students in science and math literacy to students of other countries. There is widespread belief that American's ability to compete in the world economy in the future will depend on a highly trained work force, both scientifically and technologically. Our ability to conduct research and to develop new products is a serious challenge and will depend largely on the ability of today's teachers to train tomorrow's scientists. There is thus a vital need for improved quality of math and science teachers as well as a greater quantity.

The overall purpose of our project was to address both the quantity and quality issues by tapping a new source of teachers--experienced professionals who had retired but who were still active and motivated enough to want to teach and to transmit their knowledge and experience to students. Specifically, the purposes were:

(1) to alleviate the teacher shortages in math and science in areas of perceived need;

(2) to improve the quality of instruction in areas of critical national importance.

(3) to enable vigorous professionals to continue to pursue their professional interests in ways that will be personally fulfilling as well as socially useful.

(4) to attract teachers from a pool of applicants wider than the traditional 22 year old college graduate, thus diversifying the teacher force.

(5) to tap the experience of retired professionals, so that they can bring their work experiences--reality--to the classroom, and serve as role models for students, particularly minority students.

During the period of the project much debate has occurred on whether the shortage of math and science teachers is as critical as previously thought. Indeed, placement in Hartford,Connecticut, one of the sites, was virtually impossible because no need apparently existed. Nevertheless, there is strong evidence that the shortages in some rural and urban areas are real, and will continue to be so. Therefore the methodology used in the project, and the lessons learned can be useful to others. Three of the major lessons learned are the importance of collaboration, the importance of support and the importance of student teaching. These are fully discussed in summary and conclusions section on page 23.

BACKGROUND AND ORIGINS

This project is somewhat different from many retraining programs in that its primary sponsor is neither an educational institution, the military nor an industrial corporation. Rather, the sponsor is the National Executive Service Corps, a non-profit organization dedicated to enhancing the effectiveness of other organizations in the non-profit sector. NESC was established in 1978 by Frank Pace, a former Secretary of the Army, and largely through his efforts, was able to recruit retired professionals from Fortune 500 companies to contribute their time and knowledge to the improved management of organizations in health, social service, education, religion and other non-profit areas. NESC has also promoted the establishment of Executive Service Corps affiliates in over 35 cities. (For a list of the affiliates, see Appendix A.) Thus, an interconnected network of talent was available for service as management consultants.

NESC early recognized that older people--retirees--still had several productive years ahead as well as the desire to serve. Since they had been providing expanding services to educational institutions as management consultants, they thought themselves uniquely qualified to bring retirees into the field of education as teachers. Why not encourage, recruit and train senior scientists, engineers and mathematicians who were reaching the end of their professional careers to enter a second profession--teaching?

Since education per se was not the normal expertise of the organization, some administrative changes were necessary. First, a Math-Science Advisory

Committee was established (see Appendix B); the committee consisted of prominent citizens interested in math-science education in complementary ways. Second, an Education sub-group within NESC was established with a senior vice-president assigned the sole task of directing the education project.

NESC conducted a feasibility study in 1985 to determine whether there was potential interest in the idea by soon-to-be retirees, corporations and school districts. Once a significant level of interest was established, NESC applied for and received two grants--one from the Carnegie Corporation to train soon-to-be retirees at specific military and industrial sites, and the FIPSE grant which sought to attract the already retired professional from a variety of sources. (NESC subsequently received a grant from the National Science Foundation to recruit and train retirees to serve as volunteers in Baltimore, Maryland schools.)

Having the FIPSE project sponsored by an outside organization rather than a university was both advantageous and disadvantageous. NESC proved most helpful in the recruitment process. The initial target group, the already retired professional, was not easy to reach since it was necessary to use professional organizations, retirement associations, newsletters, professional journals and in-house publications. For these contacts, the network provided by NESC was invaluable. Any individual brought to NESC as a management consultant could provide entree into an individual corporation, or the President of NESC, Frank Pace, and later Robert Hatfield, could address the Business Roundtable and other associated corporate organizations. Thus, a wide audience for potential

recruitment was readily reached. This same network was also useful dissemination activities. There was some advantage, too, in being part of a larger "education group" for the provision of support services--copying, typing, phone assistance, meeting and conference facilities.

The fact that NESC had little prior involvement with the public education sector itself, either at the high school or college level proved to be a disadvantage to the project. NESC's experience was with corporate retirees, and they understood neither the way colleges operate nor the pedagogical rationale for an education curriculum. Moreover, they did not understand the need to tap the expertise of the Advisory Committee. Although this committee consisted of many high level leaders within the educational community and/or access to educational organizations, it was virtually not called upon.

There was an extremely strong belief at NESC that those whose first career had been in technical professions would not require very much in the way of preparation. They believed that a highly individualized program, limited in scope, would suffice because of the candidates' prior background and experience, their age, and their ability to acquire information quickly. Because of this belief, a great deal of time was spent in exploring sites that had time-shortened programs as the route to the first teaching credential. Indeed, New York City and Hartford were chosen largely for this reason.

As the project developed, it was demonstrated that simply being an experienced professional was not enough of a credential to become a good

teacher. Ultimately, NESC realized that much more was needed to support the trainees and additional requirements were built into the FIPSE program as well as the Carnegie program. (See Project Description on page 9 and following pages.)

One important conclusion we have reached is that sponsorship of new efforts more properly belongs with educational institutions; these institutions can cooperate with corporations or military organizations, rather than the other way around. Organizations such as NESC are important in the recruiting and dissemination process because they have large networks with corporations and the military but this is primarily an education program and it belongs under the leadership of those who understand it best.

Over the three years of this grant, the major effort was concentrated in New York City. New York City was selected for three reasons:

(1) At the inception of the grant a shortage of mathematics and science teachers did exist; indeed, teachers were being recruited for the temporary per diem license (TPD) with no training in education or any knowledge of what schools were like. Our contention was that the NESC program could offer something positive to candidates and the schools.

(2) NESC was located in New York City, the headquarters of many professional organizations and corporations which would facilitate recruitment.

(3) Probably most important was the strong relationship the project director had established with members of the United Federation of Teachers (UFT) and the New York City Teacher Centers Consortium (NYCTCC). These two groups provided invaluable support in teaching classes, providing host schools for observations, chairing information workshops, providing assistance in preparation for Board of Education examinations, and facilitating licensing procedures such as filing of forms or fingerprinting. These organizations also have the capacity to provide ongoing support to the project participants after the grant was completed.

The relationships with the Board of Education, the UFT, and the NYCTCC remained strong throughout the period of the grant and will continue beyond the period of the grant. By the end of the grant period, outside constraints such as budget cuts, chancellor changes, personnel shifts and procedural changes have made placement more difficult. The fact remains, however, that for a program such as this to succeed, a strong, positive relationship with the educational community is essential.

PROJECT DESCRIPTION

The project implemented by NESC consisted of five main parts: recruitment, orientation, training, placement, and support.

RECRUITMENT

The already retired professional, one who is free-standing in the community, is difficult to recruit. NESC was helpful in gaining access to retiree organizations of major corporations, to company newsletters and retiree organizations, as well as to professional organizations. During the period of the grant several corporations such as General Foods, AT&T, and IBM began to "downsize" and we were asked to make presentations to potential early retirees, as part of a company's plans to assist in the transition of its employees.

As we became known as a place that would assist those who wished to enter the profession and provide support for the effort, scientists, engineers, mathematicians (and those with other backgrounds) who were thinking of making a professional change began to seek us out; the target group was expanded to include the career switchers, those who were not retirees, but a younger group who wanted to make a professional change. As a result of the various recruiting efforts we had, in effect, three groups: those already retired, early retirees as a result of company downsizing, and career switchers. The vagaries of the current economic situation thus affected the composition of our cohort.

ORIENTATION

Because we were dealing with retirees who were not necessarily thinking of a second career at all, early retirees who probably had never thought of teaching, and career switchers, who were only vaguely thinking of making a change to teaching, it was very important to afford these potential students an introduction

to public schools that was informative and realistic. Before asking participants to commit to teaching as a second career, a strong observation schedule was needed so that the realities of teaching could be seen first hand. Many of the potential candidates had not been in a classroom since they left school; many saw schools through the eyes of their own children who attended suburban or independent schools. In New York City, the media frequently portrays the schools as "dangerous. fearful, undesirable places" and these myths had to be dispelled before candidates could begin their decision making processes.

Arrangements were made for observing in several schools in both Hartford and New York City; in New York our efforts were enhanced by the strong collaborations with the UFT and NYCTCC. Several of the Teacher Centers are located in the high schools and these schools became the observation sites and the teacher center specialist the "on-site" host.

As part of the orientation program, packets of materials on observing were developed and distributed in order to help candidates understand the culture and structure of the schools they were visiting. At the end of the observation day, a "debriefing" was held with the teachers who had been observed, administrators, and other personnel. The debriefing sessions were designed to bring into focus what had been observed, to answer questions on what had been seen, and to deal with any misconceptions. In addition, informal conversations helped potential participants gain an appreciation of the enduring problems inherent in teaching, as well as the rewards of contributing to the development of young people.

As part of the orientation to schools, candidates were urged to spend an entire day with a teacher so as to observe the "dailiness" of teaching--the moving about, the home room duties, the Teachers' Cafeteria, and other duties and activities that comprise a teachers school life beyond teaching. In addition, information meetings were held to acquaint participants with the requirements for certification, the National Teacher Examination (NTE), temporary and regular licensing processes in New York City and placement procedures. Personnel from the New York City Board of Education worked very closely with the project and served as a resource for all the necessary information to ease the passage into the New York City school system.

EDUCATIONAL PREPARATION

Those professionals who elected to enter teaching after the observation component remained together as they began their preparation. The first Connecticut cohort entered the Connecticut Alternate Route Summer Program. When this proved to be unsatisfactory a program was developed with the University of Hartford. A limited number of people are participating in this and plan to ultimately enter the teaching profession.

In New York City a collaboration for the offering of courses was established initially with Brooklyn College. Teacher Center specialists served as adjunct professors of Brooklyn College; this fulfilled a commitment of the original grant that preservice teachers would be trained largely by practitioners. During the first year the participants, largely those already retired, stayed together as a cohort for

their 12 credits of training, 7 in the summer prior to their entering teaching and 5 during the first year. The support engendered by a cohort group as participants returned to formal study in a new field, and as they began to teach, proved to be very effective.

Because of the diversity of the participants in the second year, it was more difficult to keep the group together as a cohort. Some of the younger people, not wanting to interrupt their income stream, wanted to teach immediately (as was possible in New York City). Nevertheless, as the initial 12 credits required to maintain a TPD in New York, the following courses were included: Urban Education, Problems in Secondary Education, Special Education, Reading in the Content Area, and Methods of Teaching Mathematics and Science. A student teaching component was not included in the preparation program. This proved to be a serious deficiency; the problem will be discussed below.

In addition to establishing a collaboration with Brooklyn College, we also set up a relationship with Pace University which had a grant from the Pforzheimer Foundation to recruit and prepare second career teachers for New York City. Several of our participants entered this program for their education program and subsequently are continuing at Pace in order to receive a Masters in Education. This was a scholarship program and enabled some of our participants to complete their required education at no personal cost. Pace also provided a supervised student teaching program during the participants actual first year of teaching. Our assessment of the value of the student teaching experience at Pace reinforced our

conclusion that student teaching should be a requirement of any second career teacher training program.

PLACEMENT AND SUPPORT

The procedures at the Board of Education are frequently chaotic, which caused the experiences candidates had in obtaining placement to vary, but in most cases placement was certainly not smooth. Some of the problems encountered were:

* Placement was not determined until late August, early September, forcing several candidates to seek teaching assignments at private institutions.
* Assignment was made but no position was actually available in the assigned school
* Assignment was made out of the license area
* Placement was made to one school but only as a substitute to be assigned as needed
* Placement was made in schools which had no support systems.

Because of intense efforts made on their behalf by the Director through the Teacher Center and the Board of Education, most candidates were suitably placed, but not always on a timely basis.

Although mentoring of all new teachers is the responsibility of the individual school, the efficacy of such mentoring varied from shcool to school. In order to supplement (and in some cases, complement) what was or what was not being

provided in the schools, the group was periodically brought together by the Director for the purpose of discussing problems and providing mutual support. The level of mentoring, encouragement, and support by the Director through this phase as well as all the earlier phases, was stressed as the major strength of the program in all of the evaluations conducted. This will be elaborated upon further in the Summary and Conclusions.

PROJECT RESULTS

Thirty of our candidates are teaching in schools in some capacity; while their experiences varied, depending on the particular school, principal, supervisor, or mentor, some feedback on that experience was vital in order to judge the effectiveness of the project.

An early evaluation was made in February 1988, after the first group had been teaching for one semester. This evaluation consisted of phone interviews with all the teachers and their immediate supervisors. A second evaluation was made in February 1989 and consisted on in-depth interviews with 7 teachers. A third evaluation in 1989 consisted of phone interviews; the purpose of these was to learn the needs to be addressed in the support sessions run by NESC. These interviews were part of the formative evaluation of the project; a summative evaluation is not complete at the time of time writing.(1)

(1) It should be noted that the summative evaluation is part of an overall evaluation of NESC's efforts to recruit and prepare teachers and includes both the Carnegie and FIPSE projects.

The three evaluations and the initial evaluation data from the final evaluation are included in the Appendix C.

These evaluations indicated the extent of satisfaction with the program, how teachers fared in their early teaching experiences. At best, our evaluations tracked only the successes and failures after a short period of time. Longer term questions such as retention rates or teacher/supervisor satisfactions, or whether students do in fact do better with "real-life" professionals, cannot be answered after a three year project. Funds for long-term evaluation should be made available to consider these essential questions. The project will only have validity if it proves successful beyond the first or second year of classroom teaching.

At the present time there are no plans for the continuation of this project in its present form. NESC is not an educational institution and has no institutional framework nor financial capacity to continue the project. Moreover, the economic climate in New York City is such that the demand for new teachers in theses areas is weak. There is little incentive for any of the collaborators or the Board of Education to continue the program. Even if it were concluded and accepted that because of there experiences, the quality of mature teachers is greater than their younger counterparts (at least after one or two years), financial constraints prevent their use in the classroom. Our participants, currently teaching as permanent substitutes, tend to be the last in and therefore the first to go. This is true not only in a "budget crunch" but also in the spring term when enrollments in high schools declines and a high percentage of those under TPD licenses are terminated.

In spite of the financial limitations, the Director continues to maintain a strong relationship with the New York City Board of Education, the project participants and the NYCTCC and will continue to track the participants informally to ensure their continued success. Moreover, the Director is now involved in another project within an academic community, and will continue to disseminate the project goals and objectives in other areas where there seems to be need and where many of the constraints inherent in New York City do not exist.

Dissemination efforts included numerous presentations to organizations, corporations, associations, military groups, and educational organizations engaged in the study, development and implementation of second career programs for early retirees, opportunities for mature workers, downsized employees and recruitment of alternative populations to the teaching profession.

NESC held a conference in May of 1989 specifically aimed at those groups engaged in studying technical talent from and industry. This conference focussed on NESC's projects with Carnegie Corporation, FIPSE, National Science Foundation and brought together others who were involved in the recruitment, preparation and placement of senior scientists, engineers and mathematicians. (See Appendix D for the program, list of attendees and presentation abstracts.) The proceedings of this conference have gone to press and will be distributed to a wide audience early in 1991 (5 copies are included for FIPSE). The interest evoked at this conference mandates additional study of the effective utilization of the unique talent of the targeted groups and their impact on the teaching profession on a long term basis.

NESC is a national organization and while it does not have the capacity to continue projects without strong financial backing, it has over 35 affiliates through the country. (See Appendix A for a list of the affiliates.) Major presentations were made to these affiliates during their national conference and each is studying the potential of implementing a similar program in their community. Successful dissemination has already occurred in New Orleans, Houston, San Antonio, Baltimore, Delaware Valley, and Boston.

SUMMARY AND CONCLUSIONS

Several observations can be made as a result of our program:

* As time went on, the distinction between retirees, soon-to-be retirees, downsizers, or career changers became blurred. Career switchers (who generally were younger) had a slightly easier time because the financial adjustment to teaching was easier than for downsized employees who often had salaries significantly higher than those of teachers and had a greater family financial commitments.
* Placement was somewhat more difficult for those over 55 or 60 as some principals were concerned about the candidate's stamina or his/her long-term commitment; others, however were pleased to place experienced professionals because they can add something to the classroom or serve as a role model.

* Our initial short-run evaluation leads us to conclude that what is important to the success of the candidate is not age per se, but rather personality, interest, love of children and desire to serve the community. These qualities keep the "new teacher" going through the very difficult first year.

Second career teachers bring assets to the classroom that make the special preparation and support worthwhile. Their interest in young people and their desire to transmit their knowledge is a strong motivating force for their entering teaching; their age, their experience with people and decision making in other settings gives them special qualities in the classroom. Their communication skills, which have been honed in their previous job situations, can only enhance their teaching and ultimately play a significant role in introducing students to the subject matter and the real world of work.

Supervisors we interviewed thought that second career teachers bring a knowledge of their subject that is current. They can talk confidently about why specific knowledge is important to cars, stereos, or space exploration. These real-life applications can motivate students to learn.

* In spite of their proficiency in the content area of instruction, almost all the new teachers as well as their supervisors expressed the need for more subject specific pedagogy in their course of study. In

addition, there is a clear need for more work in classroom management. Most new teachers must learn not only how to manage social behavior problems that are outside their own experience, but also how to manage the classroom--how many assignments to give, how rigorous to make them, how to follow through. Ultimate success as teachers requires a strong pre-service program: skills must be acquired in classroom management, in lesson planning, in how to "chunk" information in small enough pieces to allow students to understand what is being taught.

* Support for the teachers is necessary at every step in the process--from the first observation period through the first or second year of teaching. Career changers are just that--people changing the milieu in which they work, their status, their work habits, perhaps even their income. Everything is unfamiliar. In order for them to make sound decisions, they must be informed as to what to expect in the classroom, what the program requirements are, what they will need for licensing and certification before they enter the program. All our teachers judged the observation phase of the program to be vital. During the induction year of teaching probably more support is needed for career changers than for traditional students. The older teacher may appear to be confident and competent but in fact needs much guidance and support. Some enter with very high expectations

for themselves which they soon learn cannot be met; some feel isolated in their classrooms in contrast to the group setting in which they had been working; some feel "not in control" as many policies come from above. Although problems of "bureaucracy" are particularly onerous in New York City, almost all new teachers find this aspect of teaching difficult. Ongoing support by the sponsoring institution (in this case NESC) proved very helpful in allowing new teachers to support each other, and in guiding teachers through the bureaucracy. But for a program like this to be successful, a strong mentoring program is needed within the school setting; teachers must collaborate with each other, and learn from master teachers.

* No matter how experienced they were, candidates were entering something "new". They themselves had not been students for many years; they were apprehensive about their ability to succeed. Being able to discuss their successes and challenges as well as their problems with their peers provided a large degree of comfort. Keeping the group together as a cohort proved very effective in meeting the groups needs; it permitted the group to develop a sense of "family", an atmosphere in which any personal difficulties could be discussed.

* The FIPSE project enabled NESC to recruit, orient, and prepare scientists, engineers and mathematics who had retired or were changing careers. Many kinds of collaborations are necessary for the success of a such a complex program:

  First, the training institution must collaborate with corporations, military organizations, and volunteer organizations in the community in order to recruit successfully into the program.

  Second, the institution must collaborate with the Boards of Education, school districts, and other educational organizations that support teaching, i order to determine the need in the community and to gain acceptance of this older group for the student teaching experience as well as future employment.

  Third, there should be collaboration with Teacher Centers or any other group which can provide the necessary supports before and after the preparation program in order to ease the transition to teaching.

* The program proved to be a learning experience for NESC. While the pre-enrollment support mechanisms had been built into the program, we did not realize at the outset how vital and necessary these supports were and are at all stages to the success of such a program. While we knew that support for the new teacher was important, we did not realize how vulnerable and needy the older, more mature person would really be as he/she embarked on a new career. The support

given in the schools in New York City was spotty, and while NESC itself provided some support, it was not enough, in our opinion. In future programs the training institution must plan and assure extensive support during all phases of the program if it is to succeed. It must also make certain that proper mentoring will take place in the schools before teachers are placed. Mentoring can help new teachers cope with the many problems encountered during their early days in the classroom.

* For a complex project to be successful, one that has many facets and involves collaborations with many different agencies, it is important to have one person assigned prime responsibility, both in the sponsoring institution and all the collaborating ones, too.

NESC was reluctant to accept the importance of the student teaching component, initially. It was not included in the plan of study offered; it was not subscribed to in the original grant proposal; it was not included in the many alternate routes to certification; it was not required by the New York City Board of Education of a TPD license. We have concluded however that student teaching should be an integral part of all teacher training programs. Many of the problems experienced by this group of new teachers might have been eliminated with a strong student teaching component built on a foundation of classroom management and lesson planning skills, the development of a repertoire of

teaching strategies, acquisition and knowledge about audio-visual materials, observing a master teacher over a period of time--at the very least, the teachers would have been more confident and have had hands-on experiences with supervision and training.

* Since our teachers have only completed one or two years of teaching, it is not possible to draw any conclusions based on long-term observation. We believe that for a major project such as this, FIPSE should plan for and fund a follow up grant so that tentative conclusions can be validated.

> With widespread predictions of coming teacher shortages, we face a crisis in teacher education. The temptation to take shortcuts in preparing teachers will only increase. Developing routes into teaching, whether expedient shortcuts or in-depth programs, demands a deeper theoretical understanding of teacher knowledge and its sources. Lacking such knowledge, we will be hard pressed to refute the persistent and pervasive beliefs that teacher education coursework is, at best, irrelevant and that classroom experience alone can serve as teaching education.
> (Pamela Grossman, The Making of a Teacher, 1990)

APPENDICES

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APPENDICES

(1) INFORMATION FOR FIPSE

I should like to take this opportunity to thank the FIPSE staff for their support. I had a change of program officers after the first year and both Diana Heyman and Ed Goldin were always available to discuss problems as they occurred. While most of our contact was by telephone, both made a site visit. The site visits were very important and more should be scheduled particularly as projects get underway. One visit is insufficient to capture the essence of a project especially one that is located in more than one site.

The project director meetings introduced me to the FIPSE staff and provided extensive networking opportunities with other project directors. The individual sessions in which project directors shared their activities were most beneficial. Dora Marcus was most helpful at all the meetings and was always available by telephone. It is unfortunate that she did not hold a session on writing the final report.

Regional meetings should be scheduled in between the annual meetings or attempts should be made to bring project directors together at other national meetings. While project directors tried to arrange visits informally, these did not occur. I would urge program officers to bring the regional directors together whenever site visits are made to areas having several FIPSE funded projects.

The separation between the programmatic aspects of the project and the financial division can create problems. Financial reports are filed for periods ending one to three months prior to the due date of the report. According to the regulations, cash on hand should not exceed a certain amount unless it will be spent within three days; if it will be on hand for five days, the finance division requests the money be returned and then requested again. This procedure is illogical, cumbersome, cost ineffective and unrealistic. As a non-profit organization, operating with limited funds, it would be impossible to return monies on hand because before they had already been encumbered and spent on project activities during the next period. It is not always possible to evenly divide the financial expenses into equal periods although initial requests tend to be made equally. The receipt of a letter requesting a return of funds causes phone calls, faxes, unnecessary expenditures of time and money. The procedures should be operated closed to the time line and receipt of the money. Financial reporting was never any part of a FIPSE meeting and is certainly a topic of importance.

APPENDICES

(2) CONSIDERATIONS FOR FIPSE

As the project neared completion NESC applied for a continuation grant in order to do a long term study of the overall effectiveness of the program. This request for case studies of second career teachers and their impact upon students, schools and school improvement strategies was turned down. At the same time the project director was asked to talk with a university that had submitted a proposal to set up a national center for second career teaching in another area of the country. While this preliminary proposal was a sound request, its goals and objectives were similar to the NESC FIPSE grant.

I question the validity of funding a similar project before the results from an existing project are determined. Readers of preliminary proposals are usually not involved in FIPSE projects. They are not aware of those projects in progress. The preliminary proposal writers are often unaware of projects in process. While it is appropriate for a project director to talk to someone considering a similar project, what is the value of funding a new proposal?

FIPSE staff should consider the results of existing projects before reviewing future proposals in the area of interest. Networking project directors to proposal writers is worthy but also questionable when ongoing follow-up studies would be beneficial and perhaps a better use of the limited FIPSE funding.

Emerging new directions in the recruitment and training of teachers includes:

* Professional Development Schools as part of teacher training education.
* School Based Management and Shared Decision Making as part of the entire movement in restructuring schools.
* The availability of a large number of training scientists, engineers and mathematicians interested in second careers as teachers due to military cutbacks, corporate downsizing, early retirements and a shifting economy which forces men women to work during retirement in order to pay their ever rising bills.
* Early retirements from the corporate world of men and women who still have many years of productive work ahead of them.
* Shared teaching positions, part-time teaching, and the new directions outlined in Workforce 2000.
* The predicted shortage of teachers in all disciplines and at all grade levels in the decade ahead calls for an examination of non-traditional recruits to the teaching profession. The older, mature professional should be considered as well as the housewife, military officer, career switcher and former teacher who entered a different profession after being trained for teaching.

Key considerations, given my type of project, are examined in the final report. The need for student teaching may be addressed by the changes taking place in teacher education. The professional development school movement would afford all preservice teachers the opportunity to work along side a group of master teachers throughout their teaching education program.

The unique skills brought to the classroom by second career teachers can be a strong force in the restructuring movement. Professionals who have worked in business, industry and the corporate world bring a dynamic set of presentation skills, well honed communication skills, and some expertise in the decision making process. Their exposure to the world of work should be an asset, yet untapped, in schools training for tomorrow's workforce. How can this resource be used in schools beyond the individual's classroom? That is the real question and was not answered fully during our three year FIPSE grant. The maximum amount of time any of our project participants had taught was two years - not enough time to learn all the necessary lessons.

Career switchers are looked upon more favorably that retirees; they are younger, more energetic, worthy of mentoring and time and frequently bring the same skills as a retiree despite their shorter stay in the non-teaching world. They are often better able to manage to dramatic financial change and perhaps have more realistic expectations having be away from the classroom for a shorter period of time.

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EVALUATION REPORT
FIRST COHORT OF NESC TEACHERS
SIX-MONTH TEACHING INTERVIEW

This report is based on telephone interviews conducted between February 13 and February 21, 1989, with Cohort 1 of the participants in the NESC project. The seven people interviewed were all first-time secondary school teachers during the fall, 1988 school year.

The descriptive data from the seven indicate what a diverse group they are. Six of the seven participants are men. One is retired from the military; the other six are retired from or "outplaced by" the private sector. Five of these six were with Fortune 500 companies. Three had been chemists, one was a food scientist and one was a department manager. The sixth had been an elementary school teacher early in his career, then went on to the private sector in a variety of entry level positions. One is thirty, one forty, four are in their fifties, and the oldest is 65. Of the seven, five are currently working as teachers in New york City--four in the public schools and one in a private school. All five report that they will remain with teaching, but one is pregnant and anticipates not working full-time when her baby is young.

Of the two not currently teaching, one left the public school where he was working at the end of the term and returned to his former employer as a consultant. He plans to continue to substitute teach so that he can keep his TPD license, but he believes there may be an opening in his former company and he would like to return there. The other had not gotten a permanent assignment so he left his position as a building substitute when he was offered an opportunity to go to Indonesia for the United Nations. He would take a full-time classroom of his own in his area of certification if it were offered, but he had not heard from the Board of Education at the time of the interview.

The interviews were conducted as part of the NESC formative evaluation of the project. Goals of the interview were to determine if, after six months on the job, teachers felt prepared for their teaching assignments, if they had been accepted by their colleagues and supervisors and assimilated into the workplace, and if they were satisfied with their preparation and placement. This report will be divided into those three areas, followed by some general findings and then recommendations.

PREPARATION

The seven teachers were unanimous in their praise for the NESC portion of their preparation. They reported satisfaction with the opportunity to observe in the New York City Schools, with the

courses that were arranged by NESC with Brooklyn College (although they differed in their evaluation of particular course content, with some feeling a need for a specific methods course in their area of certification), and with the seminars offered by the New York City Teachers' Center. Several noted that they would not have been able to "get through the maze" of the New York City Board of Education certification procedures without the help of NESC, and specifically, Ann Spindel. Without exception the teachers reported that the greatest service NESC provided was to run "interference" for them.

In most cases the amount of preparation they received from their schools differed by setting. Several of the teachers felt they were "dumped" into their schools and classrooms without adequate preparation. They spoke of walking into their assigned school and not being expected. In two of the cases, principals who were not expecting the teachers responded by sending them on to department chairpeople who decided if there was an opening for them or not. Others had to return to Brooklyn for reassignment. The teachers did not blame their schools for these problems; rather, they saw the problems originating with the Board of Education. It was clear that appropriate paperwork was not following new or transferred teachers (the NESC teachers were not alone in this situation) and that schools were not being informed in a timely fashion about teacher assignment.

However, the schools were faulted for not preparing the teachers better on-site. Those who came in after the beginning of the year missed whatever preparation was given and no one attempted to fill them in. They did not know the requirements of homeroom, how to complete the Delany cards, where to go for materials, strategies for filing paper work, etc.

Teachers also reported that the Board of Education training courses were not helpful. Those who attended the four days of before-school training felt it was a waste of time and one teacher referred to the follow-up courses as "a joke"--the catalog arrived two weeks after the courses were scheduled to start and when the scheduled course was not available, it was replaced by another course unrelated to the first.

Overall, the feelings the NESC teachers reported about their preparation reflected their frustrations with the New York City Board of Education. They saw themselves in systems which were unresponsive to their needs as new teachers and schools which were unable to anticipate the types of problems they would face. Several suggested that the "trial by fire" that new teachers are subjected to would be an anachronism anywhere else, since most systems which have the same situation occur time after time (new school year, new teachers reporting for assignment) would have devised strategies for minimizing problems and maximizing adjustment. Many had ideas for ways to help prevent

the problems of preparation that they faced. They also realized that it was unlikely that they would be able to implement (or even offer) their ideas.

ON THE JOB

Because of the uniqueness of each setting in which the teachers found themselves, they reported a variety of on-the-job experiences. They did report two areas of common concern. Almost all of the teachers (with the exception of the teacher in the private school) found the students woefully unprepared to do the tasks of high school. Teachers reported shortcomings in basic skills, in concept development, and in the students' use and understanding of simple language.

The other common area that teachers reported was that students seldom exhibited the social behaviors needed for a classroom to function. Students were often rude, inattentive, and unwilling to participate. They were likely to talk out, ignore the teacher, come in late, cut classes and disrupt the class. Most teachers also reported that there was not a lot of support from the school administration in these areas--many of the schools did not set rules and maintain an atmosphere of discipline and authority.

The full-time teachers were supervised by the Assistant Principal in their building. The amount of supervision and the quality differed in each setting. In some cases, the teacher was supervised often (three to five times during the first semester) and the feedback was helpful because it was specific to the teaching act. In other cases the supervision was reported to be desultory--a response to a requirement but without substance.

The assignment of a mentor was also dependent on the setting. In some cases the NESC teacher had to request a mentor several times before one was assigned. In two cases, the mentor was not assigned until the second term. Experiences with mentors ranged from one case where the mentor had the same teaching schedule and was not able to observe and meet with the NESC teacher to another where the situation was described as almost ideal--the mentor sat in on classes, ate lunch with the NESC teacher, encouraged and helped the teacher in every way. All of the teachers agreed that a mentor could be very important and helpful in the situations they were in; few were able to really profit from this, however.

An NESC concern had been how well mature people who had spent most of their professional lives in industry or the military would fit into the public schools and be accepted by teachers. The teachers reported a variety of responses to their earlier experiences. For four teachers, their private sector work seemed to have no impact on their colleagues' interactions with them. For another teacher, the sense of alienation he felt in his

school could not be traced to his background, but rather to his inability to speak Spanish--he had no one to talk with in the teachers' room. He also reported that the principal was concerned that he would not be willing to follow orders because of his earlier experiences. Another related the impression that because he was seen as an active scientist from industry, no one would challenge him (or give him advice). He felt that he was treated "almost as a celebrity"--that he had a special aura because of his background.

Several of the teachers did report that their experiences in the private sector were helpful to them as they began to teach. Interestingly, the teachers had similar responses to this issue and they identified two areas where their backgrounds made a difference. First, they saw themselves trained as problem-solvers. They defined themselves as people whose work experiences required them to continually take on new responsibilities. These experiences gave them confidence that they would be able to bring previously learned skills to their new jobs to figure out what they needed to do. This ability enabled them to "get through" the often convoluted requirements of the schools to which they had been assigned. Two reflected that their work experience had required them to have the attitude that their responsibility was to get the job done, regardless of the difficulties, and that's what they did in the schools.

The second area in which the teachers had similar responses was when they spoke about teaching their subject matter. Several felt that their life experiences with the content allowed them to help make theoretical material meaningful to their students. They were able to show students current uses of scientific or mathematical concepts; they were familiar with current equipment used in labs or offices; they could use real-life examples and talk with confidence about why math and science knowledge were important in the students' lives and how that knowledge could make a difference in their futures.

Some of the teachers are teaching in license; others are not. One was a building substitute and therefore he taught everything; another was prepared to teach math and is teaching Earth and Life Science; another math teacher is teaching a computer course for which he is unprepared. Even those teaching in their certification area find themselves doing a great deal of preparation and working hard to familiarize themselves with the material they are expected to present.

All of the teachers reported some classroom management problems, particularly early in the year. They spoke of being too easy going at first, of not being firm enough with rules and procedures, of not being specific enough when they gave directions or assignments, of not following through with their demands. Most have overcome those problems, although they face

many behavior problems that are beyond their scope. Students miss a great deal of school and the teachers cannot get them to class and keep them coming, even though they believe this is their responsibility. While they report generally good interactions with their students, interactions they have worked hard to establish, they also see that they are not able to have an impact on as many students as they had hoped when they began teaching.

Overall, most of the NESC teachers reported that they have made a place for themselves in the schools. Only one continues to feel uncomfortable in his setting, well into the second term. Without exception, they reported that their initial teaching experiences were difficult, more difficult than they had imagined, and that while the system discouraged them, individuals within the system encouraged them.

SATISFACTION

With the exception of the teacher who was a full-time substitute, all of the teachers felt that they had begun to accomplish something in their settings with the students they taught. Since in an earlier interview the NESC teachers had reported they were going into teaching to try to "make a difference", the observation that they were reaching some students led to an initial feeling of satisfaction with their decision to enter teaching. Now that they have a more realistic view of what to expect from the students and from the system, and with a semester of experience behind them, most of the teachers expressed positive feelings about teaching.

Nevertheless, of the seven teachers interviewed, only two believed that they would stay with classroom teaching over time, regardless of other opportunities. Five expressed some reservations. One will leave teaching (perhaps temporarily) to care for her child; two have left to consult in their fields; a fourth is not sure he can make the investment required to be successful since he will spend only a few years teaching; one does not want to continue to teach but is interested in educational administration.

There is a clear relationship between the reports of satisfaction and the individual experiences teachers have had in their settings. For those teachers whose schools immediately provided warm, supportive environments, the sense of satisfaction is greater than for those teachers who came to environments that were not initially open or helpful. The earlier a teacher had a mentor (whether it was a Board of Education assigned mentor or a Department Chairperson or Assistant Principal who took an interest in the teacher), the more satisfaction s/he reported. Teaching in certificate is related to feelings of satisfaction, as is an ability to discipline students successfully.

GENERAL FINDINGS

The interviews yielded some interesting data that do not lend themselves to any general category, but that should not be ignored. Some of these findings lead to the recommendations found in the next section. Moreover, these more idiocyncratic responses are a way to help to complete a picture of the project at its half-way point.

1. Many people believe they understand schools and what it takes to be a good teacher because they have been to school and because they have experienced success managing other people. Several of the NESC teachers reflected this sense and they were the ones who found it particularly hard to adjust to the realities of working in the public schools. These were the teachers who talked about how poorly managed the schools were; how inefficient they were; how troublesome the rules and paperwork for teachers were. The people who did not seem to understand the realities, constraints and exigencies of large, urban public schools were the most frustrated by their experiences.

2. The more independent the NESC teachers had been in their previous jobs, and the more responsibility they had had, the more abrasive they found the school system's requirements. (This may explain, in part, why the two youngest NESC teachers had the most favorable experiences in the schools.) One of the teachers was particularly upset that he was not free to teach in his own way; that he had to follow the system established by the Board of Education. Another spoke of his ideas being ignored, or rejected when he advanced them to colleagues or supervisors. A third teacher reported his frustration at having to wait in line to use the copy machine, and then at the quality of the copies.

3. For the middle class teachers, there was a real feeling of culture shock. Some of their frustration came from not being able to reach students whose backgrounds/experiences were so different from their own and those of their family. They told story after story about their students--their behaviors, their families, their attitudes, their homes. They seemed to be constantly surprised by the realities of their students' lives.

4. Seemingly, most of the participants had no idea how hard teaching would be. This realization comes out in different ways--some of the teachers saw teaching as the winding down experience of their productive years without any understanding of the commitment of time and energy teaching called for. Others thought teaching was something they could do easily, given their work experiences. (This is closely tied to the first comment in this section.) Others had close family members (wives, children) who were teaching and they saw the tasks a wife/child was doing as less complex than those required for business, and therefore not terribly difficult.

5. It may be that it is unrealistic to have a general expectation that people retired from the private sector will remain in public school teaching for five to ten years. While those people who take an early retirement (men and women in their early to mid-fifties) may be able to make the time and energy commitments that teaching requires, those who retire in their sixties may well spend only two or three years in the schools. The older retirees may find themselves spending more time in preparation than anticipated, and facing more system irritations than they are willing to put up with.

6. As a group, this is a very committed, involved and thoughtful cohort of teachers. They demonstrated an ability to analyze and to reflect on their experiences that isn't commonly found in many teachers. They have the potential to change and improve the system, to reach students in unique ways, to bring a maturity and set of life experiences to schools that is currently absent.

RECOMMENDATIONS

1. Project Personnel. It is clear from the interviews that the NESC participants felt strongly that Ann Spindel, representing NESC, played the most significant role in their preparation. All of the respondents reported that Ann's support, concern and dedication to the project enabled them to persevere in the face of the often confusing and sometimes overwhelming requirements of the New York City Board of Education. Therefore, I would recommend that this project, and any like it, have personnel ON-SITE who see as their responsibility assisting potential teachers through the morass of paperwork and regulations that school systems require.

As a corollary to that recommendation, however, I would also suggest that the role not be left to one person. Everyone connected with a program of this sort must project the sense of responsibility that Ann Spindel does, otherwise the success of the project rests with one person. Were that person to leave, there might be no one else to assume that role, creating a void for the teachers involved that cannot be filled.

As well, the role that NESC personnel play in the lives of these prospective teachers raises the issue of institutionalization. A project of this type can only be institutionalized if administrators from the school system see value in recruiting retired scientists and military personnel as teachers. Individuals affiliated with the Board of Education must assume the responsibility of easing the way for these unusual "recruits" into the system. (This is discussed further in Recommendation 5.)

2. Preparation. While the participants had no complaints about NESC's role in their preparation, many of them were not prepared

for the realities of teaching in an urban setting. Therefore, I would recommend that future participants be required to spend more time in the New York City schools. The people who entered the program were confident of their abilities--most believed that they knew what they were facing and chose therefore not to do many observations. Yet these interviews indicate that it took them a long time to acculturate. While a few more days in the schools would not solve the problems of acculturation, they might give the participants a closer look at the realities of urban teaching. It would not be unreasonable to require them to shadow a teacher in their field for a week, and to have that observation occur in a school that resembles in both population and location the type of school that first-year teachers are assigned to.

As additional preparation, it might be valuable for the prospective teachers to hear from "real teachers" in the form of case studies. Case method teaching has received much attention in the educational journals recently, and a case course based on the experiences of urban science and math teachers, with focus on classroom management, teaching methods and appropriate materials, taught by someone experienced in case method teaching, could serve as a better preparation than the courses the participants currently enroll in.

Moreover, it seems clear that these students would benefit from a specific methods course in their area of specialization (either math or science). Since these teachers will not have had the opportunity to student teach, they need very specific information about teaching their content. General teaching information, offered from a theoretical perspective only, will not give these people the type of support they will need to walk into classrooms "cold".

3. Liaison with Board of Education. For most of the participants, their frustrations began at the point that NESC no longer had any control over the process--assignment by the Board of Education to a school. It would be helpful if NESC could continue to intervene in the process wherever possible. This is a murky recommendation because it is unlikely that NESC personnel will be able to do much about the black hole that information seems to disappear into at the Board of Education office, but if someone is flagging these particular teachers, there is some likelihood that a few of the problems might be handled with less grief. This may require that contact people in the certification and assignment offices be "courted" by NESC staff to ensure better communication for these particular teachers. There could be a long-term payoff to this activity since it would enhance the process of institutionalization by identifying the Board of Education personnel who would have a sense of responsibility for the NESC teachers.

The capacity of the Board of Education to address concerns raised by this cohort of new teachers is limited because of policy issues and union contract agreements. Teachers with seniority have the ability to request transfer to a school of their choice by a specific date. These requests are handled by the Placement Office at the Board of Education. Because those requesting transfers are regularly licensed teachers, they must be given placement before those with temporary per diem licenses are considered for placement. Thus, placement does not occur until late in August.

Early on in the licensing process, the candidates were told placement could only be made through the Placement Office at the Board of Education. When placements were given out, several participants went to their assigned school and were told that no openings existed. Those at the school site did not provide any further assistance and it became impossible for the individual candidate to get back to the Placement Office by telephone in a timely fashion. In the three situations where this occurred, the Placement Office, when reached by NESC, was very supportive and did give the people assignments as Absent Teacher Replacements (ATR). While this did not place them in their discipline area, it did provide them with a full-time, permanent substitute position with benefits. This was better than the alternative of per diem substitute teaching with no benefits. Two of the three, within two weeks, received appointments in their disciplines. One person gave up after six weeks when it did not appear that a chemistry position would become available.

New teachers are frequently given the poorest classes within a department. In addition, they are often given one class not in their license area. This situation is particularly difficult for new teachers whose classroom teaching experience is limited. It is also a difficult policy issue to address because one could argue that the more senior teachers should be given the choice of better classes. Retention of new personnel remains an issue for school districts and these policy issues should be examined and perhaps some better scheduling could be considered.

The schools do not seem to be taking advantage of the skills and experience of this unique group of professionals. For example, one of the current cohort was a product manager in the cosmetics industry. His "real life" experience would probably mean more to a group of disaffected youth than any teaching experience he could bring. And yet, the school did not utilize his actual experience to help students understand why the study of chemistry is important and how to apply that knowledge in interesting and unusual ways. He is no longer with the schools because the situation he was in did not allow him to use his skills in an appropriate manner. This is an area that could be explored with the union, the Board of Education and supervisors in whose schools these people are appointed.

Many high schools have strong business programs and career projects. These people have the capacity to serve a very useful and important function with these students in conjunction with their own teaching program. This is an issue that would seem relatively easy to address with the above groups. Serving as role models and making contributions to the total educational environment is one of the advantages of using scientists, engineers and mathematicians as second-career teachers.

If this program is going to realize its potential, arrangements will have to be explored with the union, personnel at the Board of Education and at individual schools to enable some modifications to be made within the current policies. While the first group to begin teaching was small, certain generalities can be drawn and procedures considered which would make the placement and utilization of second-career teachers more rewarding to all concerned.

Individual members of the central offices at the Board of Education were most responsive to the project participants. They enabled them to move through the bureaucratic procedures in a timely and fashionable manner. They spoke with them on the telephone, addressed their concerns, gave support when needed and continually tried to make their induction into the system positive.

A Design for the Analysis of NESC Programs

E. Saxl, Educational Agenda Company, New York City

Overview

At the request of the NESC Math/Science Education Group, we are currently conducting an evaluation of the NESC Second Career Teacher Project funded by the Carnegie Corporation of New York and the Fund for the Improvement of Post-Secondary Education (FIPSE). Although the study is designed principally to measure achievement of the objectives in the original proposal, it is also intended to increase understanding of alternate route programs and the implementation of educational innovations. Conceptually, the study draws on previous research on teacher education, second careers, adult learning, educational change programs and school improvement.

Because contextual influences often drive the implementation process, a major thrust of the inquiry is to identify variations in the NESC program "model" as it is put into practice at eleven distinctly different sites. Ultimately, we hope to identify key factors that account for effective project implementation across sites to facilitate future replication of successful program components.

The stated goal of the NESC program is to "improve the overall quality of Math/Science education by recruiting teachers from non-traditional services, who will bring new perspectives to the teaching and practical application of math/science." Commensurate objectives are to "recruit, train and integrate experienced math/science professionals into the public secondary school force."

To give shape to the evaluation, three major research questions that address these objectives were developed collaboratively with NESC staff. They are:

1. Recruitment: How is the program established and what recruitment principles are used to draw participants into the program?
2. Training: How do NESC-related training programs prepare participants to enter teaching?
3. Integration: What occurs when participants enter the teaching force?

A series of sub-questions focuses on key points related to each of the research questions. In a discussion of recruitment, knowing what incentives motivate employers and participants to become involved in a second career teaching program is of prime importance. Additionally, generating awareness of program opportunities and presenting clear, persuasive information at orientation sessions are critical functions in the early stages of building program constituencies.

Similarly, in the training phase of the program, there are pressing questions related to the perceived value of specific courses, the provision of support and guidance for participants and collaboration among participating institutions to promote the effectiveness of the program.

Integration raises another set of issues. What are often bureaucratic quagmires related to placement and certification are investigated along with actual school district need for and induction of new math/science teachers. Finally, we look at participants' satisfaction with their new roles in the classroom, and their future plans.

Methods

To address these complex issues in a thoughtful manner, qualitative and quantitative approaches were combined in the research design. It is not enough to know how many people enrolled or have completed training. With this type of innovative program, it is valuable to complement these numbers with thoughtful comments from participants about their reasons to continue or to leave the program and with rich descriptions of their experiences in preparing for and entering a second career.

The study includes these specific methods:

o An initial questionnaire was designed and sent to retired individuals who expressed interest in the FIPSE program but never enrolled in the training component.

o A Participant Questionnaire with 26 questions requiring both fixed and open-ended responses was mailed to 190 Carnegie and FIPSE candidates in March. A follow-up mailing in late April went to those who had not yet returned the completed instrument. Aggregate analysis of the data will reveal patterns of recruitment, training and teaching experiences across the 11 sites. Further analysis will be conducted to clarify the distinctions between retired and non-retired candidates and between military and industrial settings. The unique characteristics of the program at each of the 11 sites will also be detailed.

o Different questionnaires with several common themes were designed for each of the participating organizations represented in the program: Employer, College or University, School District, School

Supervisor, State Education Department; and for an individual who played an active coordinating role at the site (often representing the employer), a Local Facilitator questionnaire was created. NESC provided the names of people who should receive these questionnaires, the number per category per site ranged generally from zero to four. (Thirteen school supervisors were sent questionnaires.) More than 70 questionnaires in the six categories were mailed; 44 were returned. Follow-up will be conducted by telephone.

o Mini-case studies are being conducted at six of the eleven sites. Methods include personal and telephone interviews that follow-up on and clarify survey data, and generate more detailed descriptions of the dynamic process of initiating and carrying out these programs.

o Interviews with the four NESC staff members who serve as liaisons to these sites will be conducted in late summer to expand the perspectives on what occurred between the initiation and present status of the project.

o The review of project documents is an ongoing process, encompassing NESC publications and internal reports and correspondence tracing the progress of the project at eleven sites.

PRELIMINARY SURVEY FINDINGS

Because data analysis is in progress, discussion here is limited to a profile of the participants and to recruitment questions. A full description of training and integration topics will be included in the final report.

In response to the 190 Participant Questionnaires that were mailed, 137 forms and letters were returned from the 11 sites. Information reported here was drawn from 133 completed questionnaires. Data were received from 117 males and 16 females of whom 81 are not yet retired, 40 are retired and 9 are semi-retired. Industry employed 58 people, 42 were associated with the military. Among those who designated career specialization, 41 were engineers, 20 were scientists and 19 were mathematicians.

As indicated earlier, there was keen interest in finding out what drew candidates to the program. Answering a question that allowed multiple responses, participants indicated that employers (67) were their chief sources of information about the program. Other sources included the media (30), colleagues, friends or family members (25), college (14) or another major local contact beside the employer (6).

Orientation receptions were attended by 84 participants. More than 70 of them indicated that the information was presented clearly and that it positively influenced their decision to become involved in the program.

The intrinsic rewards of teaching were clearly influential in participants' decisions to become part of the NESC projects. A question that allowed multiple responses on motivation to enter teaching elicited the following data:

110	Interest in working with young people
100	Concern about math and science education in our country
96	Opportunity to apply one's knowledge in a new way
58	Source of income
56	A change from the previous job
38	Vacation time

23 Job security
16 Reduced hours

A decision to join the program was induced by an interest in working with young people (22), a long standing desire to teach (18), a concern for math/science education (17), need for a job change (13), and an opportunity to apply one's knowledge in a new way (13).

Not surprisingly, there is a strong correlation between participants' reasons for enrolling in the program and the incentives for becoming a teacher that were stressed at the orientation sessions. According to respondents' recollections, the major theme of these presentations was the critical need for science and math teachers across the nation.

Reflecting on their concerns about joining the program, participants focussed on two major factors that are often interrelated, namely time and money. Fourteen people cited a possible conflict between their coursework and their job; associated responses included the period of time it would take to get through the program (6) and the amount of time the courses themselves would demand (5).

Nine individuals referred to a concern about tuition and 12 cited low teaching salaries as a potential problem. Finally, 12 participants were not certain how they would relate to students and handle discipline issues, and seven had mixed feelings about "learning to learn again."

For those who were not yet retired, some concerns about time and finances may have been alleviated by offers of support from employers. According to participant data, employers encouraged participation through:

42	Tuition reimbursement
35	On-site classes
24	Released time
9	Financial support (not specified)

The ability to engage in on-site classes had strong appeal for candidates who expressed satisfaction with the flexible nature of the program which they felt was "tailored to their needs."

Although many participants did not respond to the question on how they financed their coursework (11 indicated that they did not take courses), others reported the following:

38	On their own
17	VA benefits
13	Tuition refund
10	Partially on their own and through benefits
6	Partial tuition refund
5	Partial scholarship

These resources from candidates are mirrored in the data provided by employers. Because the sample is so small in the non-participant categories, numbers are not reported here along with the information. Employers do report providing on-site classes, tuition reimbursement, financial support and released time for those who elected to participate in the NESC project.

Incentives that motivated employers, colleges and school districts to become involved in the project included the need for qualified teachers as a means to improve education, an interest in alternate route programs and second career opportunities for employees.

Because of the idiosyncratic nature of the program at each site and with respect to each of the constituencies, a question on the nature of "agreements" with NESC drew a wide range of responses. Colleges agreed to offer special training programs, employers/local facilitators were involved in recruitment and training matters, school districts offered support and placement opportunities. A number of respondents indicated that agreements were "informal" but often"professional" and that close relationships were developed with NESC liaisons. State Education Department representatives had no special agreements with project staff.

Because the program has been in effect for one to three years at different sites, participants are at various stages in the process of becoming second career teachers. More than 50 of the respondents indicate that they have obtained teaching positions. Training and support issues will be discussed in detail in the final report, along with participants' application of their previous career knowledge and experiences to their new positions.

To bring some closure to this brief summary of the findings, it is clear that those individuals who returned the questionnaire are pleased with their experiences. Among the 133 participants, 56 are very satisfied, 45 are somewhat satisfied and 11 are not satisfied with the program. Reasons for satisfaction include the achievement of personal and professional goals, an organized, supportive and

flexible program and high quality instruction that provided good preparation for teaching. Stated problem areas include inadequate communication, program rigidity, certification and placement obstacles and disillusionment with schools.

In conclusion, this evaluation study is designed to promote thoughtful reflection on the program's history, enhanced understanding of the implementation process, and the generation of guidelines for replication of the model. The need for talented teachers of math and science endures as a challenge for NESC and educational institutions at large. Judging by the results of preliminary data analysis, the NESC model is a promising approach to meeting that national need.

Preliminary Report on NESC Survey Data

At the request of the NESC Math/Science Education Group, the Educational Agenda Company is currently conducting an evaluation of the NESC Second Career Teacher Project funded by the Carnegie Corporation and FIPSE. Although the study is designed principally to measure achievement of the objectives in the original proposal, it is also intended to increase understanding of alternate route programs and the implementation of educational innovations. A major thrust of the inquiry is to identify variations in the NESC program "model" as it is put into practice at 11 distinctly different sites and to specify key factors that account for successful project implementation.

Three major research questions were developed collaboratively with NESC staff:

1. Recruitment: How is the program established and what recruitment principles are used to draw participants into the program?

2. Training: How do NESC-related training programs prepare participants to enter teaching?

3. Integration: What occurs when participants enter the teaching force?

To answer these questions and more than 15 related sub-questions, the following methods are being used:

- o a participant's questionnaire
- o separate questionnaires for the employer, local facilitator, state education department, college or university, school district, and school supervisor, where applicable
- o follow-up interviews with a sample of respondents from at least 5 of the 11 sites, as a component of mini-case studies
- o review of documents
- o interviews with NESC staff members

In response to the 190 Participant Questionnaires that were mailed, 137 forms and letters were returned from 11 sites. Data were received from 115 males and 16 females, of whom 81 are not yet retired, 40 are retired and 9 are semi-retired. Industry employed 58 people, 42 were associated with the military. Among those who designated a specialty, 41 were engineers, 20 were scientists and 19 were mathematicians.

The data analysis below was conducted on 133 completed questionnaires.

How Participants Learned About the Program

Answering a question that allowed multiple responses, participants indicated that employers (67) were the chief sources

of information about the program. Other sources included the media (30), colleagues, friends or family members (25), college (14) or another major local contact beside the employer (6).

Orientation receptions were attended by 84 participants; more than 70 of them indicated that the information was presented clearly and that it influenced their decision to become involved in the program.

Motivation to Become Involved in the Program

The intrinsic rewards of teaching were clearly influential in participants' decisions to become involved in the program. A question on motivation to enter teaching, that allowed multiple responses, elicited the following data:

110	Interest in working with young people
100	Concern about math and science education in our country
96	Opportunity to apply your knowledge in a new way

Less significant factors included:

58	Source of income
56	A change from the job they had been doing
38	Vacation time
23	Job security
16	Reduced hours

A decision to enter the program was induced by an interest in working with young people (22), a long standing desire to teach (18), a concern for math/science education (17), need for a job change (13), and an opportunity to apply knowledge in a new way (13).

There is a high degree of correlation between participants' reasons for initiating a connection with the program and the incentives for becoming a teacher that were stressed at the orientation sessions. According to respondents' recollections, the major theme was the critical need for science and math teachers across the nation.

Reflecting on their concerns about joining the program, participants focused on two major factors that are often interrelated, namely time and money. Fourteen people cited a possible conflict between their coursework and their job; associated responses included the period of time it would take to get through the program (6) and the amount of time the courses themselves would demand (5).

Nine individuals referred to a concern about tuition and 12 cited low teaching salaries as a potential problem. Finally, 12 participants recalled a concern about how they would relate to students and handle discipline issues, and seven had mixed feelings about "learning to learn again."

For those who were not yet retired, some concerns about time and finances may have been alleviated by support from employers. According to the data, employers encouraged participation through:

42	Tuition reimbursement
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Although many participants did not respond to the question on how they financed their coursework (11 indicated that they did not

take courses), others reported the following:

38	On their own
17	VA benefits
13	Tuition refund
10	Partially on their own and through benefits
6	Partial tuition refund
5	Partial scholarship

Content of the Training Segment

In trying to determine how participants value the training segment, they were asked to rate different types of courses:

Type of Course:	I did not take courses in:	Not Helpful	Somewhat Helpful	Very Helpful
a. Teaching methods:	21	4	21	78
b. Education theory:	35	8	44	35
c. Child and adolescent psychology and development:	43	6	31	43
d. Math or science coursework:	63	1	24	35
e. Teaching practicum:	60	-	17	42

Observed classes in local schools prior to or during training

Yes	93
No	31

If yes:

How helpful were these classroom observations?

Not helpful	3
Somewhat helpful	28
Very helpful	63

Coursework has been completed by 49 respondents, 49 others are still in the process of completing the coursework and 25 indicate that they have not completed the training. A question about practice or intern teaching drew the following answers: 29 have completed that segment of the program, 25 are still in the process, and 68 have not completed that component. Finally, 19 have received their state certification, 55 are in the process, and 50 report that they have not obtained certification.

Sources of Support for Participants

While participating in the training program, candidates were provided with varied types of guidance and support from several different sources. Guidance was provided in relation to coursework (19), course selection and degree requirements (16), placement (13), and certification (11). Encouragement and advice were offered generally, or specifically in relation to classroom methods and management, and coursework and certification matters. (There were approximately 50 responses in these categories; multiple responses were allowed.)

Both guidance and support emanated chiefly from college personnel: professors, program department heads and university counselors. NESC coordinators were also specified as a source of help, though on a smaller scale.

Regarding interaction with fellow program participants as a source of support, 43 respondents reported that they had a lot of

interaction, 59 a moderate amount, and 16 very little. Contexts of interaction included class discussions and activities, meetings, workshops and peer teaching as well as unstructured formats such as chatting before or after classes, socializing, and discussing career issues in person or on the telephone. These interactions were regarded as very helpful by 64 respondents, somewhat helpful by 52 and not helpful by 5 individuals.

Placement assistance is a natural vehicle for program support at appropriate points in the recruitment, training and integration sequence. Thirty-eight participants received help on placement issues, primarily through arranging contacts for internships and/or teaching positions and providing information on procedures, contracts and vacancies. Sixty-one respondents reported that they had not received such assistance (which may or may not mean that they were at a point where this kind of assistance was warranted).

In fact, 59 respondents have applied for teaching positions while 60 have not done so. Fifty-two report that they have obtained positions. Thirty-nine report that they did not obtain a position, but a follow-up question reveals possible confusion related to this item.

If no:

Are you still trying to obtain a teaching position?

26 Yes 27 No

A plausible explanation is that some participants who have held or currently hold positions are looking for a new or secure position for the future.

Integration

A profile of respondents who are currently teaching reveals the following information:

School:
- 45 Public
- 9 Private

Level:
- 27 High School
- 11 Middle/Junior High School

Position:
- 21 Permanent
- 21 Temporary
- 13 Part-time

Courses:
- Wide range of math/science courses

Satisfaction:
- 28 Very satisfied
- 19 Somewhat satisfied
- 8 Not satisfied

Use of math, science or engineering knowledge/skills:
- 24 Using examples, experiences from own work

Other skills from previous career:
- 5 Interpersonal
- 5 Leadership
- 5 Discipline, control

Success as a teacher:
- 23 Very successful
- 32 Somewhat successful
- 4 Not successful

Support as a new teacher:
- 26 Mentoring
- 16 NESC program
- 8 Specific college personnel
- 7 Fellow teachers
- 5 New teacher group

Future career plans:
57 Continue teaching
10 Continue present work

Reacting to the NESC Program

Most participants express satisfaction with the program; 56 are very satisfied, 45 are somewhat satisfied, and 11 are not satisfied. Twenty people cite program strengths such as good planning, organized structure, source of support, and flexibility as explanations of satisfaction. Specific references to the college component (e.g., good instruction, courses tailored to needs) were made by 13 people and some individuals indicated that the program helped them achieve their goals. (Participants had the opportunity to give one or more reasons why they were or were not satisfied with the program.)

Dissatisfaction was generated by inadequately planned programs, poor quality courses, problems with certification and placement, and discipline problems.

Recommendations for the program fall into two major groups. One set relates to continuing, expanding and publicizing the programs (18). The other group can be subdivided according to specific issues of recruitment, finances, courses, certification, placement and conditions in schools. (A more through analysis will be conducted for the final report.)

Participant Questionnaires

Site	# of Questionnaires sent out	# of Questionnaires received (first round)	# of Questionnaires received (follow-up)	# of Questionnaires received (total)	# of Questionnaires returned (wrong address)
NC	25	11	7	18	2
GA	6	4	1	5	-
TX	10	7	2	9	-
PA	14	9	2	11	-
CT	9	6	1	7	-
FL	14	6	3	9 (2 letters)	-
LA	12	6	3	9	-
NY	39	23	5	28	-
NJ	21	12	1	13	-
CA	22	14	3	17 (1 letter)	2
DC	18	9	2	11 (1 letter)	2
TOTAL	190	107	30	137	6

NOTE: Analysis was conducted on 133 questionnaires. 75%.

SITE	SDQ	CUQ	LFQ	SEDQ	SSQ	EQ
NC	**Mr. James M. Williams***	Dr. Leo Edwards Prof. David Boger Prof. Timothy Flynn Dr. Vinetta Jones	**Dr. Eldridge Sterling*** **Dr. William Cannon***			COL Gene D. Bruce
GA	Dr. Tucker Vaughn	**Dr. Joseph Murphy***	**Mr. James Marlatt***	**Dr. Carolyn Scherm***		
TX	**Dr. Joann Houston*** Dr. Midge Rach	**Dr. Kathleen Martin***	Val Wilkie	Dr. William Wale	Ms. Betty Forte **Ms. Laura Beckwith***	**Mr. Norman Robbins***
PA		**Dr. Fredericka Reisman***		Dr. Theona Waxbom		**Ms. Joy McCabe***
CT		Dr. Ed Weinswig Dr. Cecelia Weina	**Ms. Marcia Kenefick*** **Mr. Joseph O'Donnell*** Dr. John Allison, Jr.			
FL	Dr. Herb A. Sang	Dr. Carl Ashbaugh Dr. John Hansen **Dr. Daryle May***	**Ms. Nita Reynolds***			**CAPT Robert V. Goodlos, Jr.***
LA	**Virginia Ziegler*** (for Mrs. Barbara Turner) **Ms. Ella Voelkel*** Mrs. Claire Landry	**Dr. Charles Gifford*** **Dr. Judith Miranti***	**Dr. G. Harris Melvin***	Dr. Robert Crew		
NY	**Ms. Audrey Hayes Brinker*** **Mr. William Nelson***	**Mrs. Clare Cohen*** Ms. Johanna Mosca **Dr. Warren Dederick*** Dr. Rita Silverman	**Ms. Myrna Cooper***		Mr. S. Walker Mr. Euclid Mejia Mr. Kevin Connington **Mr. John Ficalora*** Ms. Susan Kass Mrs. Charlotte Graham Mrs. C. Matthew Ms. Karol Turner Stevens Ms. Eileen Solomon **Mr. Brian Walsh*** **Mr. Stanley Simon*** Ms. Haven Henderson Mr. Robert Epstein	
NJ	**Dr. Peter Contini*** (letter)	**Dr. Thomas Gallia*** Prof. Billie Chambers Prof. Barry MacGibney		Dr. Leo Klagholtz **Ms. Ellen Schecter***		**Ms. Joy McCabe***
CA	Dr. Thomas Payzant Mr. George Russell	**Dr. George Mehaffy*** (letter)* **Mr. Randall Souviney*** Ms. Pat Baxter Dr. Eileen Wright				Adm. Benjamin T. Hacker (rec.d RADM John Adams) LCDR Kathy Sapp **Fred Larsen***
DC		**Ms. Mary Louise Ortenzo***	**Mr. Edward Colliton***			**LT Mary Murphy*** **CAPT Frank Horn*** **Dr. Martha Brownlee** ADM W.J. Davis, Jr. **BRIG GEN William Meehan** BRIG GEN R.L. Dilworth **Ms. Dee Flynn**
		Dr. Jay R. Shotel				

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College or University Questionnaires

Site	# of Questionnaires sent out	# of Questionnaires received	# of Questionnaires returned
NC	4	-	
GA	1	1	
TX	1	1	
PA	1	1	
CT	2	-	
FL	3	1	
LA	2	2	
NY	4	2	
NJ	3	1	
CA	4	2 (1 letter)	
DC	2	1	
TOTAL	27	12	

Local Facilitator Questionnaires

Site	# of Questionnaires sent out	# of Questionnaires received	# of Questionnaires returned
NC	2	2	
GA	1	1	
TX	1	-	
PA	-	-	
CT	3	2	
FL	1	1	
LA	1	1	
NY	1	1	
NJ	-	-	
CA	-	-	
DC	1	1	
TOTAL	11	9	

School Supervisor Questionnaires

Site	# of Questionnaires sent out	# of Questionnaires received	# of Questionnaires returned
NC	-	-	
GA	-	-	
TX	2	1	
PA	-	-	
CT	-	-	
FL	-	-	
LA	-	-	
NY	13	3	
NJ	-	-	
CA	-	-	
DC	-	-	
TOTAL	15	4	

School District Questionnaires

Site	# of Questionnaires sent out	# of Questionnaires received	# of Questionnaires returned
NC	1	1	
GA	1		
TX	2	1	
PA	-	-	
CT	-	-	
FL	1	-	
LA	3	2	
NY	2	2	
NJ	1	1 (letter)	
CA	2	-	
DC	-	-	
TOTAL	13	7	

State Education Department Questionnaires

Site	# of Questionnaires sent out	# of Questionnaires received	# of Questionnaires returned
NC	-	-	
GA	1	1	
TX	1	-	
PA	1	-	
CT	-	-	
FL	-	-	
LA	1	-	
NY	-	-	
NJ	2	1	
CA	-	-	
DC	-	-	
TOTAL	6	2	

Employer Questionnaires

Site	# of Questionnaires sent out	# of Questionnaires received	# of Questionnaires returned
NC	1	-	
GA	-	-	
TX	1	1	
PA	1	1	
CT	NA	NA	
FL	1	1	
LA	-	-	
NY	NA	NA	
NJ	1	1	
CA	2	1	
DC	7	2	
TOTAL	14	7	

NOTES: The same individual represents the employer for both the PA and NJ sites.
Most likely, when Hacker (CA) recommended Adams, Adams gave questionnaire to Larsen.

Sources of Information About the Program

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
Employer	71	26	2	43	32	30	4
College	14	2	-	11	6	8	-
Other major local contact	7	-	3	3	2	2	1
Newspaper, television or radio	30	9	3	18	12	7	6
Colleague, friend or family member	26	4	1	20	12	7	2
Other	15	5	2	8	7	3	2

Multiple responses accepted.

Orientation Session Attendance

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
Attended orientation session	88 (64%)	29 (67%)	7 (70%)	51 (63%)	38 (62%)	30 (71%)	12 (71%)
Did not attend orientation session	49 (36%)	14 (33%)	3 (30%)	30 (37%)	23 (38%)	12 (29%)	5 (29%)

Orientation Session Evaluation

(Number and percentages relate to those people who attended orientation.)

Information presented clearly	79 (91%)	24 (86%)	6 (86%)	48 (94%)	37 (97%)	27 (93%)	8 (73%)
Information not presented clearly	8 (9%)	4 (14%)	1 (14%)	3 (6%)	1 (3%)	2 (7%)	3 (27%)

Effect of Orientation Session on Decision to Participate in the Program

(Number and percentages relate to those people who attended orientation.)

Information helpful in making a decision about the program	76 (85%)	22 (76%)	5 (71%)	49 (94%)	35 (92%)	27 (90%)	9 (75%)
Information not helpful in making a decision about the program	13 (15%)	7 (24%)	2 (29%)	3 (6%)	3 (8%)	3 (10%)	3 (25%)

Motivation to Consider Teaching as Second Career

	Aggregate N = 137	Retired N = 43	Semi-ret. N = 10	Not ret. N = 81	Industry N = 61	Military N = 42	Other N = 15
Source of income	58	11	5	40	19	18	11
Job security	23	1	-	21	5	10	4
Opportunity to apply knowledge	100	31	8	60	51	30	10
Change from job	57	12	3	39	23	22	7
Interest in working with young people	113	36	9	65	48	38	12
Concern about math and science ed.	103	36	7	59	49	32	9
Vacation time	38	7	2	28	13	12	5
Reduced hours	16	3	-	13	6	3	3
Other	12	1	-	11	5	4	2

Multiple responses accepted.

Motivation to Become Involved in the Program

31	Quickest, best way to get credentials
25	Concern for math/science education
24	Working with young people
22	Long standing desire to teach
18	Need for a job change
16	Opportunity to apply knowledge in a new way

Concerns About Becoming Involved With the Program

TIME

15	Conflict between courses and job
6	Length of time between entry and certification or teaching
3	Finding time to do student teaching
5	Time (not specific)

FINANCES

13	Low teacher salaries
9	Paying for program

PROGRAM REQUIREMENTS

7	Meeting certification requirements
7	Learning to learn again

INTEGRATION

18	Ability to meet school and student demands
8	Placement

The Ways Participants Finance Their Coursework

41	On their own
37	Partial subsidy
18	VA benefits
16	Tuition refund

Employer Support for Participation

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
Tuition reimbursement	45	17	1	27	29	11	1
Financial support	9	2	-	7	2	7	-
Released time	24	8	-	15	8	15	1
On-site classes	36	9	-	27	16	16	2
Other	17	3	2	10	6	4	3

Multiple responses accepted.

Courses

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
TEACHING METHODS							
Very helpful	80 (63%)	22 (56%)	5 (56%)	51 (66%)	36 (63%)	27 (66%)	8 (53%)
Somewhat helpful	22 (17%)	12 (31%)	1 (11%)	9 (12%)	10 (18%)	9 (22%)	1 (7%)
Not helpful	4 (3%)	2 (5%)	-	2 (3%)	1 (2%)	-	3 (20%)
Courses not taken	21 (17%)	3 (8%)	3 (33%)	15 (19%)	10 (17%)	5 (12%)	3 (20%)
EDUCATION THEORY							
Very helpful	35 (28%)	9 (23%)	-	26 (35%)	14 (25%)	18 (44%)	-
Somewhat helpful	47 (38%)	20 (51%)	3 (33%)	22 (29%)	17 (30%)	18 (44%)	7 (47%)
Not helpful	8 (6%)	2 (5%)	-	6 (8%)	4 (7%)	2 (5%)	2 (13%)
Courses not taken	35 (28%)	8 (21%)	6 (67%)	21 28%)	21 (38%)	3 (7%)	6 (40%)
CHILD AND ADOLESCENT PSYCHOLOGY AND DEV.							
Very helpful	43 (34%)	13 (33%)	1 (12%)	29 (38%)	18 (33%)	20 (49%)	1 (7%)
Somewhat helpful	32 (26%)	14 (36%)	1 (13%)	16 (21%)	10 (18%)	16 (39%)	5 (33%)
Not helpful	6 (5%)	2 (5%)	-	4 (5%)	3 (5%)	1 (2%)	2 (13%)
Courses not taken	44 (35%)	10 (26%)	6 (75%)	27 (36%)	24 (44%)	4 (10%)	7 (47%)
MATH AND SCIENCE COURSEWORK							
Very helpful	35 (28%)	16 (41%)	-	18 (24%)	14 (25%)	15 (38%)	4 (27%)
Somewhat helpful	24 (19%)	6 (15%)	2 (22%)	16 (21%)	8 (14%)	9 (23%)	2 (13%)
Not helpful	1 (1%)	1 (3%)	-	-	-	1 (2%)	-
Courses not taken	66 (52%)	16 (41%)	7 (78%)	42 (55%)	35 (61%)	15 (37%)	9 (60%)

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
TEACHING PRACTICUM							
Very helpful	43 (35%)	19 (49%)	1 (11%)	23 (32%)	19 (35%)	16 (400%)	3 (20%)
Somewhat helpful	17 (14%)	8 (20%)	-	8 (11%)	8 (15%)	5 (13%)	2 (13%)
Not helpful	-	-	-	-	-	-	-
Courses not taken	62 (51%)	12 (31%)	8 (89%)	41 (57%)	27 (50%)	19 (47%)	10 (67%)

Courses

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
TEACHING METHODS							
Very helpful	80 (75%)	22 (61%)	5 (83%)	51 (82%)	36 (77%)	27 (75%)	8 (67%)
Somewhat helpful	22 (21%)	12 (33%)	1 (17%)	9 (15%)	10 (21%)	9 (25%)	1 (8%)
Not helpful	4 (4%)	2 (6%)	-	2 (3%)	1 (2%)	-	3 (25%)
EDUCATION THEORY							
Very helpful	35 (39%)	9 (29%)	-	26 (48%)	14 (40%)	18 (47%)	-
Somewhat helpful	47 (52%)	20 (65%)	3 (100%)	22 (41%)	17 (49%)	18 (47%)	7 (78%)
Not helpful	8 (9%)	2 (6%)	-	6 (11%)	4 (11%)	2 (6%)	2 (22%)
CHILD AND ADOLESCENT PSYCHOLOGY AND DEVELOPMENT							
Very helpful	43 (53%)	13 (45%)	1 (50%)	29 (59%)	18 (58%)	20 (54%)	1 (13%)
Somewhat helpful	32 (40%)	14 (48%)	1 (50%)	16 (33%)	10 (32%)	16 (43%)	5 (63%)
Not helpful	6 (7%)	2 (7%)	-	4 (8%)	3 (10%)	1 (3%)	2 (25%)
MATH AND SCIENCE COURSEWORK							
Very helpful	35 (58%)	16 (70%)	-	18 (53%)	14 (64%)	15 (60%)	4 (67%)
Somewhat helpful	24 (40%)	6 (26%)	2 (100%)	16 (47%)	8 (36%)	9 (36%)	2 (33%)
Not helpful	1 (2%)	1 (4%)	-	-	-	1 (4%)	-
TEACHING PRACTICUM							
Very helpful	43 (72%)	19 (70%)	1 (100%)	23 (74%)	19 (70%)	16 (76%)	3 (60%)
Somewhat helpful	17 (28%)	8 (30%)	-	8 (26%)	8 (30%)	5 (24%)	2 (40%)
Not helpful	-	-	-	-	-	-	-

Classroom Observation

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
Observed classes	96 (74%)	34 (83%)	7 (88%)	53 (68%)	39 (67%)	34 (83%)	11 (79%)
Did not observe classes	33 (26%)	7 (17%)	1 (12%)	25 (32%)	19 (33%)	7 (17%)	3 (21%)

Evaluation of Observations
(Percentages based on those who observed classes)

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
Observations very helpful	63 (66%)	22 (65%)	3 (43%)	36 (68%)	27 (69%)	23 (68%)	7 (64%)
Observations somewhat helpful	30 (31%)	12 (35%)	4 (57%)	14 (26%)	12 (31%)	9 (26%)	3 (27%)
Observations not helpful	3 (3%)	-	-	3 (6%)	-	2 (6%)	1 (9%)

Interaction with Fellow Participants

43 (35%)	A lot
63 (52%)	A moderate amount
16 (16%)	Very little

Ways to Interact with Fellow Participants

77	Socializing before/after or outside work
50	Program course meetings, workshops, etc.
17	Team activities

How Helpful were These Interactions?

65 (52%)	Very helpful
55 (44%)	Somewhat helpful
5 (4%)	Not helpful

(Percentages are based on the number of participants who responded to the related questions.)

Training Coursework

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
Completed the training coursework	50	24	-	25	25	8	6
Did not complete the training coursework	28	8	8	12	16	4	3
Still in the process	49	8	-	40	14	29	5

Practice Teaching

	Aggregate N=137	Retired N=43	Semi-ret. N=10	Not ret. N=81	Industry N=61	Military N=42	Other N=15
Completed the practice teaching	29	15	-	14	10	8	4
Did not complete the practice teaching	72	18	8	44	37	20	7
Still in the process	25	7	-	18	9	12	2

Certification

	Aggregate N = 137	Retired N = 43	Semi-ret. N = 10	Not ret. N = 81	Industry N = 61	Military N = 42	Other N = 15
Received state certification	19	10	2	7	5	8	4
Did not receive state certification	54	16	8	30	36	8	4
Still in the process	55	13	-	40	15	25	6

Placement

	Aggregate N = 137	Retired N = 43	Semi-ret. N = 10	Not ret. N = 81	Industry N = 61	Military N = 42	Other N = 15
Placement assistance provided	38	17	3	18	18	7	4
No placement assistance	63	20	2	40	25	24	8

(N.B.: Some respondents indicate that they have not requested placement assistance to date.)

Teaching Position

	Aggregate N = 137	Retired N = 43	Semi-ret. N = 10	Not ret. N = 81	Industry N = 61	Military N = 42	Other N = 15
Obtained a teaching position	52	23	2	27	19	11	10
Did not obtain a teaching position	39	13	4	21	20	13	3
Still trying to obtain a teaching position	26	10	2	12	8	11	4
Not trying to obtain a teaching position	27	9	4	14	14	6	3

Current Teaching Assignment

	Aggregate N = 137	Retired N = 43	Semi-ret. N = 10	Not ret. N = 81	Industry N = 61	Military N = 42	Other N = 15
Currently teaching math or science	46	20	3	27	17	10	8
Not teaching math or science	74	19	6	49	37	25	6

The Type of Schools Where Participants Currently Teach

45	Public
9	Private

The Level of Schools Where Participants Currently Teach

3	Elementary School
12	Middle/Junior High
20	High School
6	College/Adults

The Type of Teaching Positions Participants Have

21	Permanent
21	Temporary
13	Part-time

Courses Participants Teach

51	Math
31	Science
5	Computer- Math, Literacy,

Currently Teaching Another Subject

19	Currently teaching another subject
95	Not teaching another subject

Subjects Respondents Teach

4	Substitute Teaching
3	Military Communications
Other -	1 each: Accounting, business, English, Health, etc.

Degree of Satisfaction with Current Teaching Assignment

28	(50%)	Very satisfied
19	(35%)	Somewhat satisfied
8	(15%)	Not satisfied

Use of Math Science Knowledge and Skills in Teaching

49	Application of work experiences to teaching

Other Skills Utilized in Teaching

19	Interpersonal/communication
15	Leadership/supervision
9	Organization/planning

Degree of Success in Teaching

23	(38%)	Very successful
32	(54%)	Somewhat successful
4	(8%)	Not successful

(Percentages are based on the number of participants who responded to the related questions.)

Support Participants Received While Teaching

24	NESC program (college or other program related staff)
13	School staff
11	Mentoring
6	None

Future Career Plans

61	To continue teaching
12	To start teaching in future
11	To continue to work

The Number of Years Participants Plan to Teach

11	1-5 years
13	6-10 years
4	11-15 years
8	16-20 years
2	20-30 years
7	A few years
4	Indefinite
3	Until retirement
10	Not sure

Overall Satisfaction With the Program

58 (50%)	Very satisfied
46 (40%)	Somewhat satisfied
12 (10%)	Not satisfied

Reasons for Satisfaction

34	Organized, flexible, supportive program
26	Achieved personal/professional goals
9	High quality instruction
7	Courses varied in quality
3	Problems surfaced but program addressed them

Reasons for Dissatisfaction

13	Miscellaneous problems, especially finances
8	Problems with certification/placement
6	Disillusioned with teaching
5	Program lacked coordination, communication poor

(Percentages are based on the number of participants who responded to the related questions.)

Recommendations for the Program

19	Continue program
19	Address certification/placement issues
17	Improve courses - stress other courses (Methodology) (Practicum)
17	Modify requirements
16	Improve coordination/communication
13	Expand program → to other disciplines
13	Deal with miscellaneous problems, especially finances
12	Target different students
9	Try to change schools/school systems

Comments

11	Address certification/placement issues
11	Deal with miscellaneous problems
10	Try to have an effect on schools
10	Plan to teach in future
9	Positive experience, excellent program
5	Modify program requirements
2	Teaching is rewarding
2	Publicize program more
1	Encourage networking —

A few people said re: communication

IHE

Between & amongst participants

Capitalize on adults + their experience

TECHNICAL TALENT FROM THE MILITARY AND INDUSTRY

A Resource for Our Schools

A Conference Sponsored by the National Executive Service Corps

HELD AT THE

IBM Palisades Advanced Business Institute

Wednesday and Thursday, May 30 and 31, 1990

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TECHNICAL TALENT FROM THE MILITARY AND INDUSTRY
A Resource for Our Schools

IBM PALISADES ADVANCED BUSINESS INSTITUTE

WEDNESDAY, MAY 30,1990

11:00 **REGISTRATION AND LUNCH**

1:00 **OPENING SESSION** **Room C350**

Chair: **Don Black**, President, NESC Math/Science Group

Welcome: **Woody Bliss, Manager, IBM Palisades**
Robert S. Hatfield, Chairman and CEO, NESC

Don Black, NESC's PROJECTS IN MATH/SCIENCE EDUCATION

1:30 **GENERAL SESSION 1** **Room C350**

Second-Career Teacher Training Programs: College/University Perspectives
Chair: **Ann L. Spindel**, Math/Science Group, NESC.
Co-Chair: **W. Ross Brewer**, Vermont State Education Department.

Jay R. Shotel, George Washington University, DC. CRITICAL VARIABLES IN ALTERNATIVE TEACHER EDUCATION PROGRAMS: CAN UNIVERSITIES RESPOND?

Henry L. Fernandez, Teachers College, Columbia University, NY. NON-TRADITIONAL POOLS OF TEACHERS--WHO ARE THEY?

Sandra Flank, Pace University, NY. MATURE ADULTS ENTERING TEACHING

Helen Freidus and Gail Robinson, Manhattanville College, NY. A TEACHER EDUCATION PROGRAM FOR SECOND-CAREER TEACHERS

Mark Littleton, Tarleton State University,TX. THE TARLETON MODEL FOR ACCELERATED TEACHER CERTIFICATION (TMATE)

John Fischetti and Allan Dittmer, University of Louisville, KY. A SECOND CAREER PROGRAM UTILIZING PART-TIME TEACHING POSITIONS

2:30 **General Discussion**

3:00 **BREAK**

3:30 Technology in Tomorrow's Science/Math Classroom: A Review and Demonstration.
Chair: **Juliet R. Simms**, New York Working. USING THE COMPUTER IN SCIENCE AND MATHEMATICS INSTRUCTION

W. King Gillen, IBM NewYork Education Services
Vincent J. Cusimano, Computer Education Consultant to IBM

5:00 **Opportunities for assisted hands-on experience with computer technology in math and science.**

6:00 **RECEPTION** **The Great Hall**

6:30 **DINNER** **Main Dining Room**

8:00 **GENERAL SESSION 2** **Room A350**

Retiring Military Personnel as Second-Career Math and ScienceTeachers.
Chair: **William Dell**, U.S. Navy
Co-Chair: **Jay Shotel**, George Washington University, DC

R.L. Dilworth, U.S. Army. PENTAGON PLANNING AND MILITARY SECOND-CAREER TEACHERS

Leo Edwards, Fayetteville State University, NC. THE CREATION OF ATOMS

Nila Reynolds, Jacksonville Naval Air Station, FL. STRATEGIES FOR RECRUITING MILITARY PERSONNEL TO THE TEACHING PROFESSION

Daryle C. May, Jacksonville University, FL. SECOND CAREER AS A TEACHER (SCAAT)

Thomas Lutton, U.S.C.G.(ret), Second-Career Math Teacher, NY. COAST GUARD OFFICERS INTERESTED IN MATH/SCIENCE TEACHING

Martha Brownlee, Naval District Washington, and **Robert MacDonald**, Old Dominion University, VA. VALUE OF PRIOR EXPERIENCE TO THE SCHOOL SYSTEM; RECRUITING MILITARY PERSONNEL/COMMUNITY BASED COLLABORATION

9:00 **General Discussion**

THURSDAY, MAY 31

5:30 CONTINENTAL BREAKFAST AVAILABLE

7:00 DINING ROOM OPEN FOR BREAKFAST

8:30 **GENERAL SESSION 3** **Room C350**

Programs with School District and Corporate Participation
Chair: **Robert J. Cooper**, Math/Science Group, NESC.
Co-Chair: **Saul Yanofsky**, Public Schools, WhitePlains, NY.

Fredericka K. Reisman, Drexel University, PA; **Joy K. McCabe**, GE Aerospace; **Theona Waxbom**, PA Department of Education; **Lewis Roosa**, GE Second Career Teacher; and **R. J. Cooper**, NESC. AEROSPACE SCIENTISTS AND ENGINEERS AS MATHEMATICS/SCIENCE TEACHERS: A COLLABORATIVE MODEL

Jo Ann Houston, Fort Worth, TX. CERTIFICATION PROGRAMS BASED IN THE FORT WORTH INDEPENDENT SCHOOL DISTRICT

Ella Voelkel, New Orleans, LA. IMPACT OF A SECOND CAREER PROGRAM ON A PUBLIC SCHOOL

Barbara Bontemps, Chevron Corporation. MID-LIFE CAREER CHANGE TO SCIENCE AND MATHEMATICS TEACHING.

Nancy Roberts, Lesley College, MA. PROJECT BRIDGE: THE PLANS AND THE REALITIES

Ray Nord, IBM External Programs. CAREER ALTERNATIVES AT IBM

9:30 **General Discussion**

10:00 BREAK

10:30 **PARALLEL MINI-SESSIONS:** **(Locations to be announced)**

A. **ALTERNATE ROUTES FOR SECOND-CAREER TEACHERS**
Chair: **William M. Wale,** Austin, TX.

Adrion Baird, U.S. Department of Education. ALTERNATIVE CERTIFICATION OF TEACHERS

William M. Wale, ALTERNATIVE CERTIFICATION IN TEXAS: A COLLABORATIVE MODEL

Jane Newman, New Jersey Dept of Education. THE NEW JERSEY ALTERNATE ROUTE

B. **VOLUNTEERS AND SUBSTITUTES IN MATH/SCIENCE TEACHING**
Chair: **Ted Drury,** NESC Math/Science Group.

H. Bernard Miller and Matthew H. Bruce, Temple University College of Education, PA. RECRUITING, TRAINING AND CERTIFYING SUBSTITUTES IN MATH AND SCIENCE

Ted Drury, A SCIENCE/MATH ENRICHMENT PROGRAM

C. **CASE STUDIES TO PREPARE TEACHERS: A PARTICIPATORY DEMONSTRATION**
Co-Chairs: **R. Silverman and W. Welty,** Pace University,NY.

D. **MENTORING AND OTHER SUPPORT FOR MATURE NEW TEACHERS**
Chair: **Steven K.Million,** Winthrop College, SC.

Leonard D. Wechsler, DeWitt Clinton High School, NY. SPECIAL NEEDS OF SECOND CAREER TEACHERS

Mark Littleton, Tarleton State University, TX. RESEARCH ON THE ROLE OF THE MENTOR

Kenneth Burrett, Duquesne University, PA. BECOMING A TEACHER BY TEACHING: THE DUQUESNE INTERN PROGRAM

Steven K. Million, INDUCTING FIRST AND SECOND CAREER TEACHERS: AN EFFECTIVE SCHOOL BASED MENTORING PROGRAM

E. **THE NEW YORK HALL OF SCIENCE** **Peggy Cole and Roy Goldberg,**
THE SCIENCE TEACHING CAREER LADDER: A PATH TO A SECOND CAREER IN SCIENCE EDUCATION

11:30 LUNCH

12:30 GENERAL SESSION 4 C350

Analysis and Impact: Programs and New Teachers
Chair: **Dorothy Windhorst**, Math/Science Group, NESC.
Co-Chair: **Ellen Saxl**, Educational Agenda Company, NY.

Johanna Mosca, NY City Teachers Centers Consortium. THE SECOND-CAREER TEACHING EXPERIENCE

Mark O'Shea, Fairleigh Dickinson University, NJ. JUMP STARTING ON EMPTY: LESSONS LEARNED IN TRANSITIONS TO TEACHING

Joan M. Krejci, Union College, NY. BEGINNING RESEARCH INTO SECOND CAREER TEACHERS: WHAT THE RELATED LITERATURE TELLS US

Bonnie Troxell, Susquehanna University, PA. EFFECTIVE TRACKING OF SECOND-CAREER TEACHER TRAINEES AND GRADUATES

Ellen Saxl, Educational Agenda Company, NY. DESIGN FOR THE ANALYSIS OF NESC PROGRAMS

Lisa Hudson, The RAND Corporation, DC. OBSERVATIONS ON THE RAND REPORTS

W. Ross Brewer, Vermont State Education Agency. POLICY AND DATA: THE CRITICAL MARRIAGE

1:45 General Discussion

2:15 Short Break

2:30 ROUNDTABLE DISCUSSIONS - HOW CAN WE ASSESS THE VALUE OF THIS RESOURCE?

3:30 REPORTS FROM ROUNDTABLES

Donald K. Black, Concluding Remarks

4:30 ADJOURNMENT

PRINTED RESOURCE MATERIALS ON MATH/SCIENCE EDUCATION

"Education's Greatest Untapped Resource" - Report of the Second-Career Math/Science Teacher Feasibility Study

"Education's Greatest Untapped Resource" - A Brochure*

"Why Teach" - A Brochure for Potential Teachers*

"Wanted - Volunteers" - A Brochure for Recruiting Volunteers*

"Sourcebook for Teacher Candidates" - A Reference Pamphlet about Training and Certification Requirements Throughout the U.S. (Summer, 1990)

"Tapping Senior Technical Professionals for New Careers as Teachers: A Model for a Community Based Effort" (Summer, 1990)

"Tapping Senior Technical Professionals - A Summary"

Model Program Brochures /Checklists For the Community Coordinator, the University and the School District

Report of the Independent Analysis of the NESC Math/Science Projects. (Fall, 1990)

"Technical Talent from the Military and Industry: A Resource for Our Schools - Proceedings of a Conference". (Winter, 1990)

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* = Included in registration materials

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